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Owikeno Lake (Rivers Inlet, Statistical Area 9) Fall Sockeye Salmon Escapement Survey 1991

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July 1992

Canadian Data Report of
Fisheries and Aquatic Sciences
No. 883

Fisheries and Oceans Pêches et Océans
Canada

Canadian Data Report of Fisheries and Aquatic Sciences

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Survey 1991

by

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92-07482/

c Minister of Supply and Services Canada 1992
Cat. No. Fs 97-13/0883E ISSN 0706-6465

Correct citation for this publication:

Bachen, S.K., I. Winther and R.D. Goruk. 1992. Owikeno Lake (Rivers Inlet, Statistical Area 9) fall sockeye salmon escapement survey 1991. Can. Data Rep. Fish. Aquat. Sci. 883: iii + 16 p.

ABSTRACT

Bachen, S.K., I. Winther and R.D. Goruk. 1992. Owikeno Lake (Rivers Inlet, Statistical Area 9) fall sockeye salmon escapement survey 1991. Can. Data Rep. Fish. Aquat. Sci. 883: iii + 16 p.

Rivers Inlet sockeye salmon stocks spawn in the Owikeno lake system (Canada Department of Fisheries and Oceans, Statistical Area 9). Tributaries of Owikeno Lake are surveyed annually to enumerate sockeye escapement. In 1991 a total of 346,500 sockeye escaped to the Owikeno lake system. Three representatives of the commercial fishing industry accompanied department staff during the industry tour. This report summarizes the 1991 fall enumeration survey. Operation of the Genesee camp and required repairs are outlined.

RESUME

Bachen, S.K., I. Winther and R.D. Goruk. 1992. Owikeno Lake (Rivers Inlet, Statistical Area 9) fall sockeye salmon escapement survey 1991. Can. Data Rep. Fish. Aquat. Sci. 883: iii + 16 p.

Les saumons rouges qui reviennent de l'inlet Rivers frayent dans le reseau du lac Owikeno (zone statistique 9, Peches et Oceans Canada). On fait chaque anee un releve des tributaires du lac Owikeno pour faire le denombrement lors des echappees de saumons rouges. En 1991, 346,500 saumons rouges se sont diriges vers le reseau du lac Owikeno. Trois representants du secteur de la peche commerciale ont accompagne les employes du Ministere lors des evaluations. Le present rapport donne un resume des releves effectues a l'automne de 1991. Il decrit egalement le fonctionnement du camp Genesee et les reparations qui doi ent etre apportees.

INTRODUCTION

Owikeno Lake (Statistical Area 9) is the largest sockeye salmon (*Oncorhynchus nerka*) producing system in the Central Coast. Sockeye returns to Owikeno Lake support commercial fisheries in the lower reaches of Rivers Inlet.

Sockeye salmon are enumerated in spawning streams of Owikeno Lake annually from September to October. Full descriptions of the watersheds have been documented by Thomson, Bachen & Goruk, 1988, Winther, Bachen & Goruk, 1989, 1990, and Bachen, Spilsted and Goruk, 1991.

The Machmell Camp was first inspected at the end of March during the herring season. The camp was in good shape, except for the outside jumper float and a small storage float. The storage float was destroyed in winter storms and an 18' Davidson boat was lost. The decking on the jumper float was smashed and lifted by debris pounding into it during the winter storms. Several chains and some cable had to be replaced throughout the camp.

Everything worked well, with only a few leaks in the water line under the float and on the beach. The water reservoir was moved to a higher area behind the camp to increase water pressure. At the same time, the water line was tied in the trees, about 10' above the ground to stop the bears from chewing holes in it.

METHODS & RESULTS

Machmell Camp was operated from September 4 to October 21, 1991. Two contract people were hired for the duration and another contractor was hired from September 30 to October 21.

Water and propane systems were connected and repaired. Water had to be pumped from the lake because the small creek behind camp previously used for water was dry.

A new "stiff-leg" was installed behind the Palace. Chain and cable were used to secure this log to the beach and float. At the same time, several shore fastenings were replaced around the camp with one inch cable. Next season, several more "stiff-legs" will have to be replaced along the standing boom, behind camp.

River systems were surveyed approximately every ten days, weather and water conditions permitting. Escapements for sockeye streams appear in Table 1. Systems were usually walked or boated to a regular site where the survey was terminated. These sites exist where obstacles prevent fish from continuing up the river or where crews cannot proceed. Table 2 documents the usual distance surveyed in each system and the distance surveyed in 1991. Table 3 lists the daily record of sockeye escapement surveys in 1991. Most of the

streams exhibited low escapements in 1991. Exceptions and enumeration difficulties are noted below. Daily weather and lake levels appear in Table 4.

The sampling goal for 1991 was to collect hypural length, sex and otoliths from 100 fish from each stream surveyed in Owikeno Lake. Samples were collected from the Ashlulm, Inziana, Neechanz, Dallery, Sheemahant, Washwash and Wannock Rivers. Samples were taken from carcasses in all streams other than the Wannock River where a beach seine was used to collect sockeye. Egg retention data was collected for female sockeye from the Ashlulm, Neehcanz, Dallery, Sheemahant, and part of the Washwash River samples. Carcasses were difficult to collect in the Tzeo, Genesee, and Machmell systems due to high water, low escapement and/or heavy bear predation. Complete samples of 100 fish were obtained from the Ashlulm, Inziana, Washwash, Sheemahant and Wannock Rivers. Only 10 and 12 fish respectively were sampled from the Neechanz and Dallery systems. Sampling data appear in Appendices 1 to 7. Otolith age data was only completed for the Wannock River.

Gillnet drift sets described below were made with a 15 m (50 ft) length of gillnet 3 m (10 ft) deep. Dimensions of the beach seine used were 60 m (200 ft) long and 6 m (20 ft) deep. Both nets were set from a 5.5 m (18 ft) aluminum river boat with 90 hp jet outboard motor.

GENESEE CREEK

Genesee creek received no escapement of sockeye in 1991. The few fish entering this system were eaten by bears. Higher water levels from creek enhancement could alleviate this problem.

INZIANA RIVER

Total sockeye escapement to the Inziana River was 32,000. Spawning sockeye were observed from early September to mid October. Water conditions were silty throughout the survey.

The dike blocking the Inziana breakthrough completed in 1988 was effectively diverting water to the main spawning beds in the lower portion of the river. However, the river continued to cut into a section of the upper dike at the site of the old breakthrough. Further repairs may have to be required in 1992.

MACHMELL RIVER

The Machmell River was surveyed in 1991 by helicopter and by jet boat. The river was surveyed as far as the first logging bridge, including Clear Creek, located approximately

100 meters below the bridge. Both these systems are very silty, making it difficult to count fish. A channel of the Machmell still cuts into Clear creek from the bridge site. The remainder of the river is very channelized and fast, making it difficult to drift net or seine. 1991 was the first time in many years a jet boat has been able to navigate past the confluence of the Machmell and Neechanz Rivers up stream to the bridge site. No fish were observed in surveys of the river. A drifted gill net caught only two sockeye. A few sockeye were observed in the shallow side channels during a helicopter survey. No escapement was estimate was made for the Machmell River this year.

NEECHANZ RIVER

Sockeye escapement to the Neechanz River was 20,000 in 1991. Counting conditions were fair in September and October. The water level in the lower Neechanz (below the logging bridge) was considerably higher than previous years. This was a result of one of the main channels of the Machmell River entering approximately 300 m further up the Neechanz, stemming the flow. Otolith sampling in the Neechanz was difficult as grizzly bears had eaten most of the carcasses.

SHEEMAHANT RIVER

The Sheemahant River had an escapement of 100,000 sockeye. Water conditions were relatively stable in 1991. Visibility remained poor due to glacial silt and normal or slightly above normal water levels. Redds were visible in the shallows and on the gravel bars during lower water conditions. During a helicopter inspection on September 28th, more redds were observed below the logging bridge than above the bridge. Redds were present to the cascade. No evidence of fish or redds were observed above the cascades.

Four beach seine sets were made September 29th in four standard locations below the logging bridge. Total catch was 76 male, 61 female and 0 jack sockeye, 17 coho.

During the industry inspection on October 13th, two gillnet sets were made above the logging bridge for a total of 2 male and 1 female sockeye, and 2 coho. The first set was made about 1/2 mile above the hot springs. The second set was about two hundred meters above the hot springs. Three beach seine sets were made below the bridge at standard sites. The 1st set just below the bridge at site #1 resulted in a catch of 13 male, 10 female, 1 jack sockeye and 6 coho. The second set at Site #3 produced 27 male sockeye, 20 female sockeye, 6 coho and 1 trout. Set 3 at Site #4 caught 19 male 11 female, 1 jack sockeye, 16 coho and 1 trout.

TZEO RIVER

The Tzeo was inspected only once this year as the water never cleared enough to see sockeye. When inspected on September 28 by helicopter, most of the sockeye were spawning in the upper river, above the log jam. Only 350 sockeye were estimated in the river on this inspection. The total sockeye escapement for the year was estimated at 2500.

WANNOCK RIVER

Sockeye escapement to the Wannock River was estimated to be 125,000. The Wannock River was extremely difficult to enumerate throughout the season as silty conditions prevailed. Water levels were normal during the industry inspection on October 17. Two seine sets were made at standard sites during the Industry Tour. Set # 1, approximately 100 yards below the outlet of Owikeno Lake, had a catch of 540 sockeye and set # 2, just below set # 1, had a catch of 1150 sockeye and 1 coho. Seining was easier this year as the river bottom had been cleared of snags and other debris by the Oweekeno Band. There was a fair to good showing of sockeye throughout the area above the spring pool to the lake. Fish were also showing behind Smoke House Island.

Normal chinook salmon beach seining and marking operations in the Spring Pool were not carried out in 1991. The Oweekeno Band and Snootli Creek Hatchery staff were collecting brood stock and tagging chinook during the Industry Tour. Later, chinook carcasses were recovered in a dead pitch program (Winther 1992). This program estimated 3900 female chinook escaped to the Wannock River. Final chinook escapement was estimated at 6500 for 1991.

WASHWASH RIVER

The Washwash River had a low escapement of only 25,000 sockeye in 1991. Spawning sockeye were observed from early September to late October. The river level was normal with clear conditions for all surveys, except during the industry tour when it was above normal and slightly turbid making fish countability poor to nil.

Permanent repairs are still required to stabilize the Washwash River. The temporary dikes built in 1988 have not washed out, but the river is starting to cut through to the Tzeo, above the lower dike. Additional breakthroughs from the old main stem to the new main stem dried up in low flow conditions during the winter resulting in the loss of spawn from approximately 2500 females.

INDUSTRY TOUR

The industry tour occurred from October 10 to 19, 1991. All of the systems were surveyed except for the upper section of Dallery River. A helicopter was available for two days of the tour. Some Owikeno Lake systems, the Smokehouse, Canoe, and Docee Rivers in Long Lake and the Nekite River and Spawning Channel were inspected from the air. The weather during the tour was mixed with several days of heavy rain.

Industry representatives:

Name	Representing	Dates attended October
Dave Pashley	B.C. Packers, Bella Coola	11-21
Jim Cameron	UFAWU	10-21
Marty Basso	Canadian Fishing Co.	10-16

Fisheries representatives:

Name	Title	
S.K. Bachen	Technician	10-21
R.D. Goruk	Biologist	10-21
I. Winther	Biologist	10-21
G. Rahier	Fishery Officer	12-21
L. Enderud	Act. Ast. Dist. Sup.	16-21

CAMP REPAIRS REQUIRED

Gas and diesel containment is still a problem. Nothing was done in 1991 to contain fuel. All the fuel was transported in 45 gallon drums with the Sea Truck, and stored in the new warehouse at Machmell. This storage was a fire hazard and did not comply with the W.H.M.I.S. standards. A fuel float with an open shed will have to be built in 1992.

The "Palace Residence" is in drastic need of repairs. The roof exterior needs to be repaired. New ceiling tiles and insulation are required. The floor tiles are lifting and should be replaced with linoleum. The exterior is very weathered and needs to be painted. More work is required to protect the building from damage by martens.

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TABLE 1. 1990 Escapement data for Owikeno Lake systems.

SYSTEM	1991 ESCAPEMENT
AMBACK	17,000
ASHLULM	12,000
DALLERY	10,000
GENESEE	0
INZIANA	32,000
MACHMELL	0
NEECHANZ	20,000
OWIKENO LAKE SPAWNERS	3,000
SHEEMAHANT	100,000
TZEO	2,500
WANNOCK	125,000
WASHWASH	25,000
TOTAL:	346,500

TABLE 2. Distance to survey termination sites from the mouths of streams and distances surveyed during the 1991 Industry Tour.

SYSTEM	NORMAL DISTANCE SURVEYED (km)	DISTANCE SURVEYED DURING THE 1990 INDUSTRY TOUR (km)	MAXIMUM DISTANCE SURVEYED IN 1990 (km)
AMBACK	3.0	3.0	3.0
ASHLULM	3.5	3.5	3.5
DALLERY	3.8	1.0	3.8
GENESEE	1.3	1.3	1.3
INZIANA	1.6	1.6	1.6
MACHMELL	*	0	0
NEECHANZ	4.0	4.0	4.0
SHEEMAHANT	6.0	10.0 **	14.0
TZEO	4.5	1.0	4.5
WASHWASH	2.5	2.5	2.5

* Machmell usually not surveyed.
** Usually only survey to logging bridge.

TABLE 3. OWIKENO LAKE 1991 - DAILY RECORD OF SOCKEYE ESCAPEMENT SURVEYS.

DATE	STREAM	EST. NO. SOCKEYE			METHOD	WATER			COMMENTS
		LIVE	DEAD	%NEW		COND.	VIS.	LEVEL	
OCT 18	AMBACK	10000	920	50	WALK	TEA	GOOD	ABOVE NORM	FISH THROUGHOUT. INDUSTRY. TFY 17,000.
SEP 07	ASHLULM	6500		50	HLCPTR	CLEAR	GOOD	NORMAL	BULK OF FISH IN LOWER RIVER. RIVER HAS SHIFTED SLIGHTLY.
SEP 20	ASHLULM	5100	500	30	WALK	CLEAR	GOOD	ABOVE NORM	EST. 80% OF FISH IN LOWER RIVER.
OCT 07	ASHLULM	2600	496	100	WALK	CLEAR	EXLNT	BELOW NORM	FISH THROUGHOUT, HEAVIER IN LOWER RIVER.
OCT 14	ASHLULM	1400		10	WALK	SILT	GOOD	ABOVE NORM	INDUSTRY. TFY 12,000.
SEP 07	DALLERY	750			HLCPTR	TEA	GOOD	NORMAL	LAND SLIDE AT FIRST GRAVEL BAR. 1500 FISH SEEN, APP. 1/2 PINKS.
SEP 21	DALLERY	1700	4	88	WALK	CLEAR	GOOD	NORMAL	EST. 1700 TOTAL SX IN STREAM.
SEP 28	DALLERY	1500			HLCPTR	CLEAR	GOOD	NORMAL	
OCT 04	DALLERY	4000	200	30	WALK	CLEAR	EXLNT	NORMAL	LOTS OF NEW FISH NEAR MOUTH OF RIVER.
OCT 19	DALLERY				WALK	DARK	POOR	ABOVE NORM	NO EST. VERY FEW FISH HOLDING ON FIRST GRAVEL BAR. TFY 10,000.
SEP 09	GENESEE	20		95	WALK	CLEAR	EXLNT	ABOVE NORM	FISH HOLDING IN DEEP POOLS.
SEP 22	GENESEE	208	4	80	WALK	TEA	GOOD	ABOVE NORM	100 OF THE FISH HOLDING IN POOL AT MOUTH.
OCT 05	GENESEE	350	100	80	WALK	CLEAR	EXLNT	NORMAL	MOST FISH COUNTED IN LOWER POOLS, VERY LITTLE ACTIVE SPAWNING.
OCT 14	GENESEE	100			WALK	CLEAR	GOOD	NORMAL	TFY 0. ALL THE FISH WERE EATEN BY BEARS.
SEP 18	INZIANA	N\A	N/A	20	WALK	SILT	POOR	ABOVE NORM	SAMPLED FOR OTOLITHS ONLY: WALKED TO SECOND GRAVEL BAR.
SEP 24	INZIANA	10000	700	40	WALK	SILT	FAIR	NORMAL	OLD FISH IN UPPER RIVER, NEW FISH IN LOWER AREAS; FISH HOLDING AT MOUTH.
SEP 28	INZIANA	7000	1000	N/A	HLCPTR	SILT	FAIR	NORMAL	DIFFICULT TO COUNT; EST 70% OF MAX. CAPACITY FOR REDDS.
OCT 01	INZIANA	6300	350	15	WALK	SILT	GOOD	NORMAL	FISH THROUGHOUT THE RIVER; MOST CARCASSES IN LOWER RIVER.
OCT 16	INZIANA				BOAT	SILT	NIL	ABOVE NORM	TFY 32,000.
OCT 16	MACHMELL						NIL		TFY 0. NO FISH ON BANKS. FEW BIRDS.
SEP 19	MARBLE	650	50	50	WALK	CLEAR	GOOD	ABOVE NORM	LESS FISH IN LOWER CHANNEL CLOSE TO THE ROAD.
OCT 03	MARBLE	320	20	50	WALK	CLEAR	GOOD	NORMAL	310 FISH COUNTED IN UPPER BRANCH, 10 IN LOWER CHANNEL.
SEP 09	NEECHANZ	5000			HLCPTR	SILT	FAIR	ABOVE NORM	INCLUDES MARBLE CREEK (600).
SEP 09	NEECHANZ	6000	0	80	WALK	SILT	POOR	ABOVE NORM	COUNTED UP TO GRAVEL BAR ABOVE MARBLE, EST 6000.
SEP 19	NEECHANZ	6400	0	50	WALK	SILT	POOR	ABOVE NORM	EST.6400 FISH IN RIVER. ALL DEAD FISH EATEN. 10 GRIZZLY BEARS.
OCT 03	NEECHANZ	6000	0		WALK	CLEAR	GOOD	BELOW NORM	EST.6000. LOTS OF MORTS CAUSED BY BEARS.
OCT 10	NEECHANZ				FLOAT	SILT	NIL	ABOVE NORM	SEINE SET. #1: 13 SX; #2: 7 SX, 9 COHO. TFY 20,000.

TABLE 3 CONTINUED. OWIKENO LAKE 1991 - DAILY RECORD OF SOCKEYE ESCAPEMENT SURVEYS.

DATE	STREAM	EST. NO. SOCKEYE			METHOD	WATER			COMMENTS
		LIVE	DEAD	%NEW		COND.	VIS.	LEVEL	
SEP 19	SHEEMAHANT				FLOAT	SILT	NIL	ABOVE NORM	WALKED ALL BARS BELOW BRIDGE TO COLLECT OTOLITHS, ONLY ONE CARCASS.
SEP 28	SHEEMAHANT	60			HLCPTR	SILT	NIL	NORMAL	MOST REDDS BELOW BRIDGE, SOME ABOVE, NONE AT TOP END. MANY BIRDS.
SEP 29	SHEEMAHANT				FLOAT	SILT	NIL	NORMAL	3 SEINE SETS: #1: 0; #2: 40 M, 26 F; #3: 0; #4 36M 35F SX.
OCT 13	SHEEMAHANT				FLOAT	SILT	NIL	ABOVE NORM	GILLNET SETS ABOVE BRIDGE: #1: 1F SX, 2 COHO; #2: 2M SX. SEINE SETS: #1: 13 M, 10 F; #2: 27 M, 20 F; #3: 19 M, 11 F, 1 J SX. TFY 100,000.
SEP 28	TZEO		80		HLCPTR	SILT	POOR	NORMAL	EST 350. MOST FISH ABOVE UPPER LOG JAM. TFY 2,500.
SEP 28	SHMHT FLATS	1100			HLCPTR	CLEAR	FAIR	NORMAL	4 SCHOOLS ON FLATS.
OCT 06	SHMHT FLATS	600		90	FLOAT	CLEAR	POOR	BELOW NORM	ONE LARGE SCHOOL BY CABIN. TFY 3,000.
OCT 17	WANNOCK				SEINE	SILT	POOR	NORMAL	2 SEINE SETS: #1: 540 SX; #2: 1150 SX. TFY 125,000 .
SEP 10	WASHWASH	6000	34	55	WALK	CLEAR	GOOD	NORMAL	FISH THROUGHOUT, MANY NEW CHANNELS CUT FROM OLD TO NEW MAINSTEMS.
SEP 23	WASHWASH	7000	300	60	WALK	CLEAR	GOOD	NORMAL	FISH THROUGHOUT, SCHOOLS OFF MOUTH. ALL NEW FISH IN LOWER RIVER.
SEP 28	WASHWASH	5000			HLCPTR	CLEAR	GOOD	NORMAL	THREE LARGE SCHOOLS AT MOUTH OF RIVEP.
OCT 02	WASHWASH	11,000	400	70	WALK	CLEAR	GOOD	NORMAL	MANY LARGE SCHOOLS, MOSTLY NOT PAIRED: APPROX. 2000 AT MOUTH.
OCT 16	WASHWASH	2000		0	WALK	TURBID	NIL	ABOVE NORM	TFY 25,000.
SEPT 28	3RD NARROWS	1150			HLCPTR	CLEAR	FAIR	NORMAL	FISH IN SHALLOWS BY CREEK MOUTH. TFY INCLUDED IN SHMHT FLATS.

ABBREVIATIONS: BT = BOAT, CHIN = CHINOOK, COND = CONDITION, DRFT = DRIFT, EXT = EXTREMELY, EXLNT = EXCELLENT, F = FEMALE, GN = GILLNET, HLCPTR = HELICOPTER, M = MALE, NORM = NORMAL, PK = PINK, SHMHT = SHEEMAHANT, SN = BEACH SEINE, SX = SOCKEYE, TFY = TOTAL FOR YEAR, VIS = VISIBILITY, WISK = WHISKEY

Table 4. Owikeno Lake 1991 daily weather and lake levels.

DATE	LAKE LEVEL (m) AM	PM	AM WEATHER	PM WEATHER
04-Sep	N/A	10.80		high overcast
05-Sep	10.78	10.66	overcast fog	rain
06-Sep	10.74	10.74	broken cloud	clear, with some cloud
07-Sep	10.75	10.60	light overcast, fog	sunny, W. wind
08-Sep	10.42	10.34	clear, W wind	clear, W wind
09-Sep	10.14	10.00	light overcast	light overcast, W wind
10-Sep	9.85	9.65	clear	sunny, light N/W
11-Sep	9.62	9.60	light overcast	clouding over brisk N/W
12-Sep	9.65	9.84	cold & raining	overcast & rain
13-Sep	10.00	10.00	fog, cold, rain	rain, light W wind
14-Sep	9.86	9.78	sunny breaks	clouding over W wind
15-Sep	9.86	9.70	light overcast	rain, fog
16-Sep	9.88	10.43	partialy cloudy	sunny periods
17-Sep	10.58	10.66	broken cloud	showers
18-Sep	10.75	10.80	clear, very crisp	sun/ heavy cloud
19-Sep	10.92	10.72	sun & some cloud	cold N/W wind
20-Sep	10.65	10.60	partly cloudy	N/W wind, cold
21-Sep	10.35	10.06	sun, cloud patches	light N/W
22-Sep	9.90	9.84	low overcast, rain	rain
23-Sep	9.76	9.72	overcast	sun, cloud patches
24-Sep	9.70	9.68	thick fog	clear & sunny
25-Sep	9.65	9.62	clear	sunny, smoke haze
26-Sep	9.58	9.60	sun, smoke haze	clear
27-Sep	9.64	9.74	overcast	some sunny periods
28-Sep	9.80	9.65	overcast	overcast, calm
29-Sep	9.60	9.42	clear	some cloud, calm
30-Sep	9.36	9.28	low fog	high overcast
01-Oct	9.22	9.15	overcast	sunny & calm
02-Oct	9.00	8.92	high cloud	clear, calm
03-Oct	8.86	8.72	slight overcast	clearing
04-Oct	8.60	8.50	clear & sunny	clear, N/E outflow
05-Oct	8.40	8.35	clear	clear, sunny, warm
06-Oct	8.35	8.32	cloudy, warm wind	cloudy, heavy W wind
07-Oct	8.30	8.25	clear, calm	sunny & calm
08-Oct	8.20	9.15	low cloud high winds	cloud, rain, light wind
09-Oct	9.85	9.90	heavy rain	high overcast, sunny
10-Oct	10.75	11.10	thick fog	clear & sunny
11-Oct	11.15	11.40	fog, cleared briefly	overcast, heavy rain
12-Oct	11.50	11.73	overcast, some sun	overcast, sunny
13-Oct	12.10	11.70	overcast, drizzle	overcast, clear patches
14-Oct	10.85	10.40	clear, sunny	clear, sunny, warm
15-Oct	10.26	10.35	low cloud, rain	heavy rain, high wind
16-Oct	10.80	10.96	overcast, sun breaks	rain, low snow level
17-Oct	10.78	10.28	overcast	light rain
18-Oct	10.30	10.20	cloud, rain	cloud, rain
19-Oct	10.00	10.20	cloudy, drizzle	drizzle
20-Oct	10.52	11.50	heavy rain	heavy rain
21-Oct	12.60	N/A	cold & clear	

APPENDIX 1. 1991 Ashlulm River sockeye samples collected 20 Sept. 1991.

Box # 80192 #	SEX	Hypural Length (mm)	Nose/Fork Length (mm)	Egg Ret.	Box # 80193 #	SEX	Hypural Length (mm)	Nose/Fork Length (mm)	Egg Ret.
1	M	490	655		1	M	460	605	
2	M	530	690		2	M	515	685	
3	M	530	690		3	F	510	655	15
4	M	530	710		4	M	510	670	
5	M	520	685		5	M	510	660	
6	M	510	660		6	M	570	730	
7	M	458	640		7	M	530	675	
8	M	535	710		8	M	505	645	
9	F	500	600	0	9	M	470	610	
10	M	525	700		10	M	540	720	
11	M	540	700		11	M	555	715	
12	F	530	650	242	12	M	550	715	
13	M	555	710		13	M	505	655	
14	M	435	555		14	M	465	600	
15	M	530	700		15	M	500	650	
16	M	535	725		16	M	470	610	
17	M	520	690		17	M	520	665	
18	M	515	680		18	M	540	690	
19	M	465	620		19	M	520	680	
20	M	430	560		20	M	510	670	
21	F	475	590	300	21	M	470	610	
22	M	555	725		22	M	555	710	
23	M	540	720		23	M	455	590	
24	F	505	620	25	24	M	560	735	
25	M	580	760		25	F	550	645	35
26	M	550	740		26	F	520	650	5
27	M	455	610		27	M	515	670	
28	M	505	690		28	M	525	690	
29	F	510	640	60	29	M	545	700	
30	M	470	630		30	M	515	670	
31	M	545	710		31	M	535	710	
32	M	510	685		32	M	520	685	
33	F	510	640	70	33	F	525	640	1
34	M	480	625		34	F	495	605	5
35	M	555	710		35	F	500	620	0
36	M	470	620		36	F	490	605	60
37	M	555	705		37	M	460	595	
38	M	490	645		38	M	470	615	
39	M	525	695		39	M	545	705	
40	M	480	615		40	M	530	705	
41	M	540	700		41	M	530	705	
42	M	490	640		42	M	535	705	
43	M	470	625		43	M	540	720	
44	M	485	635		44	M	495	640	
45	M	445	580		45	M	460	600	
46	M	490	630		46	M	540	725	
47	M	540	715		47	M	520	680	
48	M	465	610		48	M	525	665	
49	M	505	655		49	M	515	665	
50	M	485	630		50	M	445	585	

APPENDIX 2. 1991 Inziana River sockeye samples collected 18 Sept. 1991.

Box # 80195 #	SEX	Hypural Length (mm)	Nose/Fork Length (mm)	Box # 80198 #	SEX	Hypural Length (mm)	Nose/Fork Length (mm)
1	M	460	610	1	M	520	665
2	M	495	660	2	M	525	680
3	M	530	690	3	M	505	655
4	M	460	625	4	F	480	590
5	M	495	655	5	M	545	720
6	M	510	675	6	M	455	509
7	M	485	650	7	F	510	635
8	M	450	600	8	M	485	640
9	F	475	600	9	M	520	685
10	F	515	635	10	F	480	580
11	F	485	610	11	F	530	650
12	M	470	610	12	F	540	675
13	M	525	700	13	M	480	625
14	F	505	610	14	M	530	700
15	M	45	675	15	M	535	705
16	F	500	625	16	F	535	660
17	M	500	660	17	F	495	610
18	M	485	620	18	F	480	575
19	M	530	710	19	F	535	645
20	M	515	680	20	M	475	625
21	M	555	740	21	F	515	615
22	M	520	675	22	F	500	645
23	M	540	710	23	M	530	670
24	F	515	630	24	F	505	615
25	F	465	570	25	M	485	625
26	M	520	700	26	M	515	680
27	M	515	680	27	M	535	700
28	M	446	580	28	M	545	715
29	M	440	580	29	M	530	685
30	M	540	710	30	M	495	650
31	F	565	675	31	M	525	695
32	F	495	615	32	F	510	630
33	F	500	625	33	M	495	655
34	M	515	685	34	M	475	615
35	F	470	580	35	M	555	685
36	M	530	650	36	M	520	680
37	M	520	685	37	M	555	740
38	M	450	595	38	M	465	610
39	M	550	700	39	F	545	670
40	M	540	705	40	F	535	675
41	F	505	615	41	M	525	640
42	F	485	595	42	F	510	640
43	M	540	720	43	M	530	685
44	F	495	615	44	M	535	670
45	F	545	670	45	M	465	605
46	M	485	665	46	M	510	675
47	F	535	645	47	M	470	610
48	F	495	595	48	M	440	565
49	M	575	755	49	M	470	610
50	F	495	610	50	F	520	635

APPENDIX 3. 1991 Neechanz River sockeye samples collected 3 Oct. 1991.

Box # 80191 #	Sex	Hypural Length (mm)	Nose/Fork Length (mm)	Egg Ret.
1	F	445	520	0
2	M	490	640	
3	F	415	495	0
4	F	510	605	0
5	F	525	620	360
6	F	495	595	5
7	M	475	585	
8	F	445	530	0
9	F	470	575	>500
10	F	515	605	12

APPENDIX 4. 1991 Dallery Creek sockeye samples collected 4 Oct. 1991.

Box # 80149 #	Sex	Hypural Length (mm)	Nose/Fork Length (mm)	Egg Ret.
1	F	445	505	0
2	M	420	540	
3	F	490	600	23
4	F	450	550	7
5	F	505	610	0
6	F	475	575	56
7	M	455	600	
8	M	410	540	
9	M	525	690	
10	F	470	580	7
11	F	520	610	3
12	M	470	600	

APPENDIX 5. 1991 Sheemahant River sockeye samples.

Box # 80151 #	Sex	Hypural Length (mm)	Nose/Fork Length (mm)	Egg Ret.
Collected 29 Sept. 1991.				
1	F	510	625	4
2	M	525	690	
3	M	520	685	
4	M	520	665	
5	F	475	575	11
6	F	495	585	56
7	M	520	675	
8	F	455	555	60
9	M	595	680	
10	M	580	680	
11	M	540	695	
12	M	500	655	
13	M	490	655	
14	F	485	590	2
15	M	485	650	
16	F	505	605	0
17	M	580	695	
18	F	495	595	0
19	M	540	670	
20	F	485	575	0
21	M	545	700	
22	M	560	710	
23	M	560	715	
24	F	520	610	5
25	M	390	485	
26	M	550	720	
27	M	515	660	
28	M	505	650	
29	F	515	630	0
30	M	530	695	
31	M	555	730	
32	F	500	600	1
33	M	505	670	
34	M	515	660	
35	M	520	675	
36	F	500	615	16
37	M	530	685	
38	F	505	615	21
39	M	495	670	
40	F	500	570	22
41	M	545	685	
42	F	505	595	6
43	M	555	730	
44	M	500	645	
45	F	510	615	4
46	M	520	650	
47	M	490	625	
48	M	520	690	
49	F	500	615	4
50	M	525	680	

Box # 80152 #	Sex	Hypural Length (mm)	Nose/Fork Length (mm)	Egg Ret.
1	M	525	675	
2	M	570	745	
3	M	505	635	
4	M	515	660	
5	M	540	715	
6	M	535	685	
7	M	505	665	
8	F	450	525	0
9	M	515	655	
10	M	495	640	
11	M	525	665	
12	M	520	685	
13	M	485	635	
14	M	495	665	
Collected 6 Oct. 1991.				
15	M	545	705	
16	M	515	680	
17	M	475	655	
18	M	475	650	
19	M	530	705	
20	F	500	620	0
21	F	490	590	0
22	F	460	545	64
23	F	500	600	1
24	F	540	630	3
25	M	560	720	
26	M	530	660	
27	M	535	670	
28	F	510	610	25
29	M	550	700	
30	M	440	565	
31	F	485	580	69
32	M	535	670	
33	F	550	660	0
34	M	555	700	
35	M	535	665	
36	M	530	660	
37	M	550	670	
38	M	540	690	
39	F	490	590	2
40	F	500	590	3
41	F	500	595	0
42	M	510	650	
43	M	540	675	
44	F	535	635	0
45	F	515	620	0
46	F	500	605	0
47	M	560	695	
48	F	500	600	0
49	F	510	605	3
50	F	490	600	0

APPENDIX 6. 1991 Washwash River sockeye samples.

Collected 18 Sept. 1991				Collected 24 Sept. 1991				
Box # 80197 #	Sex	Hypural Length (mm)	Nose/Fork Length (mm)	Box # 80148 #	Sex	Hypural Length (mm)	Nose/Fork Length (mm)	Egg Ret.
1	M	530	695	1	F	490	600	200
2	M	430	540	2	F	490	614	0
3	M	505	620	3	M	485	645	
4	M	490	655	4	M	565	640	
5	M	520	700	5	M	405	525	
6	M	545	710	6	M	510	695	
7	M	515	675	7	M	415	535	
8	M	470	615	8	M	540	720	
9	M	380	480	9	M	445	590	
10	F	485	580	10	M	445	485	
11	M	510	680	11	M	470	635	
12	F	535	640	12	M	560	725	
13	M	525	695	13	M	520	690	
14	M	535	700	14	M	555	735	
15	F	510	615	15	F	430	520	10
16	M	445	590	16	F	515	640	20
17	M	530	695	17	M	435	570	
18	M	390	505	18	F	490	595	5
19	M	515	690	19	F	495	610	5
20	M	475	616	20	F	500	610	0
21	M	525	675	21	M	530	690	
22	M	500	635	22	M	505	685	
23	M	525	715	23	F	495	600	1
24	F	510	605	24	M	530	695	
25	F	500	610	25	M	485	655	
26	M	400	510	26	F	495	600	0
27	F	515	610	27	M	410	525	
28	M	495	655	28	F	500	605	0
29	M	530	710	29	F	500	610	16
30	M	510	675	30	M	545	690	
31	M	485	645	31	F	475	580	0
32	M	590	680	32	F	520	620	5
33	F	490	590	33	F	505	625	45
34	M	520	675	34	F	500	620	0
35	F	530	630	35	F	535	650	0
36	F	505	595	36	M	490	625	
37	M	515	665	37	F	485	600	0
38	M	510	655	38	M	490	630	
39	M	510	685	39	M	385	500	
40	M	530	690	40	M	545	710	
41	F	435	510	41	M	425	560	
42	M	500	635	42	M	380	490	
43	F	445	540	43	M	540	720	
44	M	375	465	44	M	545	720	
45	M	490	645	45	F	515	635	2
46	M	530	690	46	F	530	660	130
47	M	535	705	47	M	455	605	
48	F	440	525	48	M	410	665	
49	M	390	495	49	M	490	645	
50	F	520	635	50	M	385	505	

APPENDIX 7. 1991 Wannock River sockeye samples collected 17 Oct. 1991.

Sex	Hypural Length (mm)	Nose/Fork Length (mm)	Otolith Age
F	400	465	42
F	440	530	52
M	395	457	42
M	480	579	52
F	390	480	42
M	405	485	42
F	410	490	42
F	440	530	52
M	415	445	s2
F	420	490	42
F	415	505	42
F	400	510	42
F	370	465	42
M	370	485	42
M	375	480	31
F	435	545	52
F	430	545	52
M	455	575	52
M	405	530	42
F	465	580	52
F	390	500	42
M	415	540	52
M	375	470	42
F	390	485	42
F	405	480	42
F	430	535	52
M	380	490	42
F	455	560	52
F	400	495	42
M	415	520	42
F	470	585	52
F	400	490	42
M	390	500	42
F	405	485	42
M	390	475	42
F	435	545	52
F	445	540	52
M	390	490	42
M	410	530	42
M	445	585	52
F	400	500	42
M	375	465	42
F	390	490	42
M	340	510	42
F	475	570	52
F	440	520	42
F	405	505	42
F	465	585	52
F	410	480	42
F	420	505	42
F	415	500	42
M	410	505	42
F	450	550	52
F	390	460	42
F	420	500	42
M	380	490	42
M	360	495	42
M	375	455	42
F	430	510	42
F	390	490	42
F	400	480	42
F	370	460	42
F	400	500	42
F	410	490	42
F	445	540	42
F	410	490	52
F	430	520	42
F	475	550	52
M	420	510	52
F	450	545	42
F	400	490	52
M	395	490	42
F	410	490	42
F	425	500	42
M	390	485	42
M	420	500	52
M	400	500	42
F	415	490	42
M	390	480	42
M	395	480	42
M	450	550	52
F	480	580	52
M	410	500	52
F	410	490	42
M	405	510	42
F	440	520	52
F	435	510	42
M	435	545	42
F	455	530	42
M	410	515	42
M	415	535	42
F	405	480	42
F	470	560	52
M	400	500	42
F	400	490	42
M	415	510	52
F	420	505	42
M	420	515	42
M	415	500	42
F	470	585	52